The Two Components of International Portfolio Flows*

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Abstract

In empirical studies and policy discussions, capital flows are almost always described in terms that connote active portfolio reallocations. But measures of international portfolio flows, whether based on flows or changes in stocks, conflate two components. Flow-based measures comprise flows due to the placement of new savings (an income effect) and flows that actively reallocate between asset classes or countries (a switching effect). Portfolio-based measures also combine a passive component (passive reallocations due solely to relative price changes) along with active portfolio reallocations. We form an easily constructed measure—relative weight—that isolates active portfolio reallocations and then, using a dataset on equity flows to EMEs and a set of simple graphs and regressions, show the importance of distinguishing between the active and passive components. The graphs suggest that the post-GFC surge of flows into EME equities was due more to the income effect and/or other passive changes in portfolios rather than the active reallocations toward EMEs. The regressions suggest that analysis of the effects of factors such as QE, VIX and capital controls on EME capital flows depend importantly on the type of flow measure used. Different questions demand different measures of flows, but existing data typically combine the focus of the researcher or policymaker (active decisions) with something more passive.

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1. Introduction

Inertia—due to both behavioral characteristics and transaction costs—figures prominently in economic and financial decision making. Inertia due to agents’ “rational inattention” impacts the effectiveness of monetary policy (Sims 2010). Inattention and inertia influence homeowners’ refinancing behavior (Andersen et al. 2015) and individuals’ decisions on retirement savings (Madrian and Shea 2001, Benartzi and Thaler 2013, Chetty et al. 2014). Investors’ inertia coupled with transaction costs can lead to sluggish adjustments of portfolios—for example, the Friedman (1977) “optimal marginal adjustment”—and, in turn, impact corporate financing strategies (Baker, Coval and Stein 2007).

In this paper we argue that behavioral characteristics such as inertia as well as institutional features of the financial intermediation industry warrant a decomposition of international capital flows into two components—one active and the other more passive. Behavioral characteristics affect decisions on how and when to adjust portfolios. And most cross-border portfolio flows are intermediated by institutions, so institutional features—such as the fact that most institutional fund managers are graded and compensated relative to size-based benchmarks—also impact portfolio adjustments. Together these behavioral characteristics and institutional features suggest that to a significant degree portfolio adjustments and, hence, capital flows, may be passive. Therefore, it is important to think of capital flows as consisting of two components—a passive one that is related to the current global constellation of markets and an active one in which investors deviate from size-based benchmark allocations.

Failure to distinguish between these two components of capital flows can hamper empirical analysis and has important implications for our understanding sources of portfolio flows. If passive flows

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1 The concepts in this paper are most directly related to the source of (rather than the effects of) portfolio capital flows—that is, cross-border flows in bonds and equities. Sometimes we will refer specifically to portfolio flows and the applications we present are based on portfolio (equity) flows. Sometimes we will use the more general term capital flows, although some components (FDI and “other”) are less related to the concepts we present.

2 Agency frictions can also cause managers to stay close to benchmarks (Buffa, Vayanos and Woolley 2014).
are both large and connected to factors such as the amount of new income and the global constellation of markets, understanding international portfolio flows requires a focus on variables such as income growth and market size. Moreover, empirical analyses of the drivers of portfolio flows that do not explicitly consider that flows have a passive component—whose determinants, such as an “income effect,” can differ from the determinants of active flows—are potentially misspecified. Any labeling of the motivations of international investors (for example, “returns-chasing behavior”) that does not explicitly consider that some of the reallocation of portfolios is passive is also potentially misspecified. The passive portion of portfolio flows, strongly related to the flow of new savings, is likely procyclical; any discussion of the procyclicality of portfolio flows—see, for example, Broner et al. (2013)—should consider the two components separately. If policymakers in emerging market economies (EMEs), when considering potential policy responses to increased capital inflows, do not recognize that a potentially substantial portion of the flows is passive, misdiagnosis is the most likely outcome.

Our goal in this paper is to bring the notion that capital flows have active and passive components to the empirical analysis of international portfolio flows. In theoretical work, this distinction already figures prominently; see, for example, Kraay and Ventura (2000, 2003) on current account dynamics and the Tille and van Wincoop (2010) model of international capital flows. But bringing the distinction to empirical work is not straightforward. As we will argue later, in practice it is difficult to disentangle the active and passive components from flow-based measures in a meaningful way. However with stock-based measures, when such data are available, the decomposition can be done more appropriately and meaningfully. One way to do the decomposition is to start with data on changes in portfolio weights, compute the passive change in these weights as resulting solely from relative valuation changes, and compute the active change in the weights as portfolio reallocations relative to buy-and-hold weights. Such a decomposition is feasible but the data requirements—returns on country i’s securities, returns on the
investors’ holdings in county \( i \) and in their entire portfolio—are onerous. We propose another, more easily constructed stock-based measure: the normalized relative weight. We will develop this measure in detail, but briefly relative weight is a country’s share in investors’ portfolios relative to its share in a global benchmark portfolio, and normalized relative weight controls for the degree of home bias on home securities to more cleanly isolate active portfolio reallocations.

To illustrate the two components, we use a dataset of U.S. investors’ flows to and portfolios in emerging market equities. The reader should note that our goal here is not to find the perfect estimated equation that explains capital flows—we leave that substantial and difficult undertaking for others—but rather to provide a way forward for the literature by illustrating the importance of distinguishing between active and passive components of flows when considering the determinants of flows.

Our analysis is through simple graphs and reduced-form regressions. In recent years, many researchers (e.g., Fratzcher et al (2012) and Moore et al (2013)) and policymakers have wondered if the Federal Reserve’s large scale asset purchases (LSAP) program, generally loosely referred to as quantitative easing (QE), prompted large EME inflows or, in the words of Brazilian President Rousseff, “a monetary tsunami.” And, indeed, we show that measures that include both a passive and an active component show that around the time of QE programs (especially the first QE program), inflows to EMEs surged and the share of EMEs in US portfolios increased. But the relative weight measure that isolates active reallocations does not show the same increase, suggesting that post-GFC flows into EME equities were due more to an income effect and/or other sources of passive changes in portfolios rather than the active reallocations of equity portfolios towards EMEs. Measures that combine two components tell one story about the impact of QE, while our measure that isolates the active component tells another. Similar results come through simple reduced-form regressions that attempt to shed light on possible drivers of flows. Three variables of recent interest—the Volatility Index (VIX), QE, and capital controls—have very
different impacts depending on whether measures include both components or isolate the active portion. 

VIX is highly significant in regressions of flows (a measure that comingles passive portfolio growth with an active component), but less so for portfolio reallocations, suggesting that VIX could be mainly capturing an income effect. Capital controls are significant when a measure that includes a passive component is used but not when active changes are isolated, suggesting that they are working through valuation changes rather than through active reallocations. Similarly, the Fed’s QE programs are important determinants with measures that include a passive component, but do not appear to impact active reallocations. Thus, conclusions about drivers of capital flows depend on whether the measure includes both components or isolates the active portion. 

One important caveat to note about our results is that since we focus on one asset class—equities, because of the greater granularity of data on equity portfolios—our analysis does not capture switches between different asset classes. If investors actively switch between bonds and equities, for example, as a result of the changes in the factors we have considered, this may show up as passive flows due to portfolio changes since our measured portfolio consists only of equities. We briefly address this point in Section 5.

Our work rests on the long empirical literature on international capital flows that dates at least as far back as Calvo, Leiderman and Reinhart (1993, 1996). Other seminal contributions include Bohn and Tesar (1996), Brennan and Cao (1997), and Chuhan, Claessens, and Mamingi (1998). A short list of more recent papers includes Griffin, Nardari and Stulz (2004), Galstyan and Lane (2013), Broner et al. (2013), Fratzscher (2012), and Forbes, Fratzscher and Straub (2013). These papers, and others, use many measures of capital flows, some flow-based and others based on the change in stocks, including the dollar amount of flows (Chuhan et al. 1998), flows normalized by average past flows (Brennan and Cao 1997), log

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3 A recognition that headline data can comprise two or more components that are fundamentally different is evident in related work. For example in a theoretical model Ghironi, Lee and Rebuucci (2015) show the importance of decomposing net foreign asset positions into underlying components.
changes in portfolio positions (Galstyan and Lane 2013), flows as a percent of lagged portfolio size (Forbes, Fratzscher and Straub 2013), changes in the portfolio share (Forbes et al. 2012), flows scaled by local market capitalization (Griffin, Nardari and Stulz 2004; Edison and Warnock 2008), flows scaled by assets under management (IMF 2014), and flows scaled by local GDP (Milesi-Ferretti and Tille 2012; Ahmed and Zlate 2014; IMF 2011). All of these measures contain a passive component as well as an active one, and the distinction between these two components has been largely absent from the empirical literature on international portfolio flows.4

The paper proceeds as follows. In Section 2 we discuss measures that combine active and passive components and those that can differentiate between the two. We illustrate the importance of differentiating passive and active reallocations through simple graphs of various measures in Section 3 and then through simple reduced-form regressions in Section 4. The regressions use a new capital flow management (CFM) measure, also developed in section 4, that goes some way toward capturing changes in the intensity of capital controls over time. In Section 5 we briefly discuss the implications of extending our relative weight measure to a case where the portfolio includes all asset classes so that we can assess the issue of active switching between asset classes. Section 6 concludes.


Many off-the-shelf measures of flows or changes in portfolio shares contain two components—one active and one that is more passive—as depicted in Box 1.

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4 There are exceptions. Curcuru et al. (2011, 2014) explicitly consider both total capital flows and active reallocations defined as deviations from a buy-and-hold benchmark. See also Raddatz et al. (2014) on the benchmark effect.
Box 1. A Decomposition of Flow- and Stock-Based Measures of Portfolio Flows

<table>
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<td></td>
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<td></td>
<td>active flows to change portfolio composition</td>
</tr>
<tr>
<td>Stocks</td>
<td>Change in Portfolio Weights</td>
<td>Passive Portfolio Reallocations</td>
<td>Active Portfolio Reallocations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>due to relative price changes</td>
<td>defined relative to buy-and-hold weights</td>
</tr>
</tbody>
</table>

2.1 Active and Passive Components in Portfolio Flows

While different questions require different measures, missing in the literature is an appreciation of a simple point raised in Tille and van Wincoop (2010): Capital flows (and, hence, the flows EMEs experience) are the result of something passive—the allocation of new savings according to last period’s portfolio weights—as well as active portfolio reallocation. Specifically, portfolio flows (CF) in period \( t+1 \) to country \( i \) are due to two components. One is the active flows \( (AF_i) \) that occur when an investor actively sells one asset for another, such as selling Brazilian equities and using the funds to buy Mexican equities. But there is a second component that can be depicted as the investor’s new savings \( (S) \) that is allocated passively based on existing portfolio weights \( (\eta_i) \). Tille and van Wincoop (2010), following Kraay and Ventura (2000, 2003), call this component “portfolio growth”, but we will refer to it as an income effect: Investors have new income, save some portion of it, and then allocate that new savings according to last period’s portfolio weights.

In terms of countries, rather than individual investors, portfolio flows can be decomposed as follows:

\[
CF_{i,t+1} = \eta_{i,t} * S_{t+1} + AF_{i,t+1} \tag{1}
\]

Thus, when using flow data, to focus on the active flow to country \( i \) we could compute the following:

\[
AF_{i,t+1} = CF_{i,t+1} - \eta_{i,t} * S_{t+1} \tag{2}
\]

where \( \eta_{i,t} \) is the weight of asset \( i \) in the investor country’s entire financial portfolio.
Equations (1) and (2) pose several practical difficulties for research using data on capital flows. First, most capital flows datasets, and thus most capital flow measures, do not disentangle the income effect ($\eta_{i,t} \times S_{t+1}$) from active portfolio reallocations. Flows due to new savings can be large. For example, over the period 2011-2013, had U.S. investors just allocated new savings (which averaged $1100 billion) to foreign equities according to existing portfolio weights (a roughly 9 percent weighting), annual U.S. flows into foreign equities would have averaged $98 billion, about 76 percent of the recorded $128 billion in annual flows. Flows due to allocating new savings according to existing portfolio weights can be a substantial portion of overall flows.

In the above, we calculated the passive portion of flows as this period’s new savings — although how much to save itself constitutes an active decision — allocated according to last period’s portfolio weights. The active portion is then the residual computed from equation (2). But, in practice, this particular decomposition is fraught with complications. The passive component of (1) and (2)—allocating new savings according to existing portfolio weights—loses some meaning as the world evolves. For example, suppose portfolio weights change due to valuation changes only. Would investors allocate more of a given amount of savings based on the new weights to the higher-valued asset, and if so should this really be viewed as a passive flow? Or, would they decrease their active reallocation to get closer to the original benchmark weights? To give another example, if a foreign market disappears, the passive component in (1) and (2) would assume investors still allocate based on last period’s weights, something that would not be possible. So while we can separate flows into an active component and one that is more passive, the relevance of that separation is not entirely clear. It is difficult, in practice, to meaningfully decompose flow-based measures into passive and active components, which is why we believe the separation of passive and active components is cleanest when using the portfolio-based measures discussed below.
2.2 Flows Are Often Considered Identical to Portfolio Reallocations

A further complication is that in the capital flows literature stock-based measures (such as changes in portfolio composition) are often equated with capital flows. This goes back at least as far as the influential Bohn and Tesar (1996) study: “[i]f expected returns change over time and investors are heterogenous…portfolio weights will change and transactions can occur. Net purchases, or capital flows in the international context, will result” and “if these variables are good proxies for changes in the expected risk-return tradeoff, then they can explain changes in portfolio composition, i.e., capital flows.” Subsequent papers readily followed Bohn and Tesar, equating flows and portfolio reallocations. Chuhani et al (1998) study “the factors motivating the large capital flows to a number of developing countries” and refer explicitly to the Bohn and Tesar (1996) framework. More recently, Fratzscher (2012) uses net capital flow to country \( i \) during week \( t \), noting that “relatively little work so far has been undertaken on investment decisions and capital flows at the micro level of individual investors and funds”, essentially equating investment decisions and flows. Edison and Warnock (2008) “assume that U.S. investors choose how to allocate their wealth…between U.S. equities and the equities of J emerging markets” and “the portfolio weight in emerging market \( j \) is given by” net U.S. purchases of stocks in country \( j \) scaled by country \( j \)’s market capitalization. Griffin, Nadari and Stulz (2004) note that “an intertemporal equilibrium model based on investors’ portfolio decisions can explain the dynamics of high-frequency equity flows”. The language in Brennan and Cao (1997), which models flows, focuses explicitly on the active portfolio reallocations of home and foreign investors. Albuquerque, Bauer and Schneider (2009) use flows (specifically, US purchases scaled by local market cap) to test their model of global return chasing (measured as a positive comovement of US investors’ net purchases with country returns).

As we will discuss below in Section 3, equating flows with active investment decisions presumes financial wealth is constant or, in the language of Tille and van Wincoop (2010), that portfolio growth is
zero because there is no new savings to allocate. Zero portfolio growth (i.e., zero new savings) was explicitly assumed in Bohn and Tesar (1996) and Brennan and Cao (1997), but that assumption seems to have been forgotten in empirical capital flows research. And, in practice, the assumption of zero new savings seems untenable (Figure 1).

While the use of stock-based measures, such as changes in portfolio weights, complicates matters somewhat in that we have more measures to keep track of and understand, there is at least one benefit. Stock-based measures bypass the need to decompose using equations (1) and (2) in part because, as we discuss next, such measures are readily defined relative to the size of the portfolio.

2.3 Changes in Portfolio Shares Eliminate the Income Effect but Still Have a Passive Component

Often capital flows research is based on changes in portfolio shares. In contrast to flows, which conflate income and switching components, portfolio share measures have the desirable feature of being able to differentiate growth in the size of the portfolio from reallocations. But even portfolio share measures conflate two components: reallocations might be active but can also be passive (i.e., occurring without any trading, due solely to relative valuation changes that alter portfolio weights). That is, consider

$$\Delta \text{Portfolio Share}_{t+1} = \omega_{i,t+1} - \omega_{i,t}$$

where $\omega_i$ is weight of country $i$ in the investors’ portfolio. But some of this portfolio change is passive, due merely to changes in relative prices. Let $R_{i,t+1}$ and $R_{P,t+1}$ be gross returns on country $i$ equities (for example) and the entire portfolio, respectively. Then the passive change in portfolio weights is $\omega_{i,t}(R_{i,t+1}/R_{P,t+1} - 1)$ – the change in portfolio weights that would occur just because of changes in relative prices.
prices – and the active change is a residual, \( \omega_{i,t+1} - \omega_{i,t}(R_{i,t+1}/R_{P,t+1}) \). The overall change in portfolio share has passive and active components:

\[
\Delta \text{Portfolio Share} = \text{Passive Change} + \text{Active Change} \\
= \omega_{i,t}(R_{i,t+1}/R_{P,t+1} - 1) + \omega_{i,t+1} - \omega_{i,t}(R_{i,t+1}/R_{P,t+1}) \\
\] (4)

which sums to \( \omega_{i,t+1} - \omega_{i,t} \), as in (3).\(^5\) As with capital flows data, off-the-shelf measures of changes in portfolio shares will conflate two components, in this case passive and active reallocations. But with portfolio share data, one can isolate active reallocations as long as \( R_i/R_P \) can be computed. In practice, if \( R_i \) and \( R_p \) are accurately measured, this way of isolating the active portion is cleaner than doing so with flow data. But accurate measurement of \( R_i \) and \( R_p \) is often not possible.

2.4 A Measure that Readily Isolates Active Portfolio Reallocations: The Normalized Relative Weight

With only limited data requirements, normalized relative weight is a measure that readily isolates a set of investors’ active reallocations. Define relative weight as a country’s share in the investors’ portfolios relative to its share in a benchmark such as the global market portfolio. That is, for US investors the relative weight on country \( i \)’s equities can be expressed as

\[
RW_i^{US} = \frac{\omega_i^{US}}{(MC_i/MC_{world})} \\
\] (5)

where \( MC_i \) and \( MC_{world} \) denote the market capitalizations of country \( i \) and the world.

Equation (5) is a straightforward summary measure of the degree of over- or underweighting of country \( i \) in investors’ portfolios.\(^6\) But the first difference of (5) is influenced by relative price changes if


\(^6\) The level of (5), a common measure of home bias defined relative to the global benchmark as used in Ahearne et al. (2004) and many others, assumes that the world portfolio is the benchmark.
portfolio and market capitalization weights differ, as they usually will.\(^7\) A simple fix is to normalize relative weight by the home country’s relative weight on its own securities. That is, define US investors’ normalized relative weight on country \(i\) as their relative weight on country \(i\) securities—country \(i\)’s share in US investors’ portfolios divided by its share in the global market—divided by US investors’ relative weight on US securities:

\[
\text{NormRW}_{i}^{US} = \frac{\text{RW}_{i}^{US}}{\text{RW}_{US}^{US}} \quad (6)
\]

Normalized relative weight—essentially, relative weight in which the degree of home bias on investors’ home securities is controlled for—is easily computed and isolates active reallocations.

To see that normalized relative weight is not affected by passive reallocations due to relative price changes, assume for simplicity a two-country world.\(^5\) Denote the quantity of Home investors’ holdings of Home and Foreign equities by \(Q^H\) and \(Q^F\). Denote supply with overbars; supply of Home and Foreign equities is \(\bar{Q}^H\) and \(\bar{Q}^F\). Let \(P^H\) and \(P^F\) be the prices of Home and Foreign equities. Therefore, the total value of Home investors’ holdings of Home and Foreign equities is \(P^HQ^H + P^FQ^F\); for simplicity call that \(X_1\). The world market capitalization is \(P^H\bar{Q}^H + P^F\bar{Q}^F\); call that \(X_2\). The weight of Foreign equities in Home portfolios is \(P^FQ^F / X_1\) and their weight in world market is \(P^F\bar{Q}^F / X_2\). Define Home investors’ relative weight in Foreign equities—Foreign equities’ weight in Home portfolios relative to their weight in the world market portfolio—as

\[
\text{RW}_F^H = \frac{P^FQ^F}{X_1} / (P^F\bar{Q}^F / X_2). \quad (7)
\]

Similarly, Home investors’ relative weight in Home equities is

\[
\text{RW}_H^H = \frac{P^HQ^H}{X_1} / (P^H\bar{Q}^H / X_2). \quad (8)
\]

\(^7\) An example sheds light on why. Consider a situation in which there is a home bias in U.S. investors’ portfolios in which the weight on U.S. equities exceeds their weight in world markets. An increase in foreign country \(i\)’s prices would increase the numerator in (5) more than the denominator, causing the ratio to increase. Intuitively, since country \(i\)’s equities are underweight in U.S. portfolios, the value of country \(i\)’s equities rises more relative to the U.S. portfolios than to the world market capitalization, leading to an increase in \(\text{RW}_{i}^{US}\).

\(^5\) We thank Eric van Wincoop for pushing us toward this algebraic illustration.
Define normalized relative weight as $RW_F^H / RW_H^H$:

$$RW_F^H / RW_H^H = (Q^F / \overline{Q^F}) / (Q^H / \overline{Q^H}).$$

(9)

As (9) shows, normalized relative weight—the share of Foreign equities owned by Home investors divided by the share of Home equities owned by Home investors—is not a function of prices.\(^9\)

2.5 The Decompositions: Summary and Numerical Examples

Box 2 summarizes the active and passive components of three different flow- and stock-based measures of portfolio flows.

**Box 2. Three Decompositions of Flow- and Stock-Based Measures of Portfolio Flows**

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</tr>
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<td></td>
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</tr>
<tr>
<td>Stocks</td>
<td>Change in Normalized Relative Weight</td>
<td>Active Portfolio Reallocations defined relative to a benchmark</td>
<td></td>
</tr>
</tbody>
</table>

Numerical examples provide more insight into the various measures and their active and passive components. Table 1 depicts a 2-period example with three countries, which we call US, (other) AEs, and EMEs. In period 1, prices are set at 1, US and AE markets are identical in size ($Q^{US} = Q^{AE} = 1$), and EMEs are half that size ($Q^{EME} = 0.5$), meaning that the weights in world markets are 0.4, 0.4, and 0.2. Also, in

\(^9\) Continuing with the example with home bias in U.S. portfolios, an increase in foreign country i’s prices would cause the U.S. investors’ relative weight on U.S. securities ($RW_{iUS}$) to also rise, pushing it in the same direction as the relative weight on country i’s securities ($RW_{iUS}$) discussed earlier. Intuitively, since country i’s equities are underrepresented in U.S. portfolios, the share of U.S. equities in U.S. portfolios declines less than their share in world market capitalization, which causes $RW_{iUS}$ to rise. As a result, the increase in country i’s prices causes both the numerator and the denominator in equation (6) to rise, and so the passive changes due to relative asset prices do not affect $NormRW_{iUS}$. 

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period 1 US investors have a home bias—US equities have a higher weight in US portfolios (60%) than in the world market portfolio (40%). Reflecting this, US relative weight on US equities is greater than 1 (1.5). At the same time, US investors are underweight both AE and EME markets, so US relative weight on those markets is less than one. The underweight on EMEs is more severe: their weight is 0.2 in the world portfolio but only 0.1 in US portfolios, for a relative weight of 0.5 (their weight in US investors’ portfolio is half their weight in the world portfolio), whereas in AE markets US investors are at 75% of the benchmark weight. Normalized relative weight on AE and EME markets, computed as their relative weights divided by US relative weight on US equities, are also less than one at 0.5 and 0.33, respectively.

We discuss three scenarios for period 2. Scenario (a) depicts flows due solely to portfolio growth. New savings are allocated according to period 1 weights. Flows occur, and prices increase. Portfolio weights do not change because we assumed the price increases were identical, so there were no relative price changes. Relative weights also do not change.

Scenario (b) is the same as (a) but prices increase more in the relatively less liquid EMEs. Flows occur, and this time the portfolio weight on EMEs increases because of the relative price change. Relative weight changes slightly; normalized relative weight does not change at all.

Scenario (c) has active reallocations from US and AE equities to EME equities. Capital flows occur—US gross sales of AE equities, US gross purchases of EME equities—and these are all active (selling US equities, selling AE equities, buying EME equities). Portfolio weights change, as do relative weights (both raw and normalized).

Scenario (d) is one of rebalancing in which US investors had in their mind that their preferred allocation was 60% US, 30% AE, and 10% EME. EME prices increased relative to US and AE, so to rebalance US investors sell EME equities. The sales of EME equities restore the initial portfolio weights.
This rebalancing is an active decision: active flows (out of EME equities) occurred and relative weights adjust.

3. Does It Matter? The Story Through Simple Pictures

We illustrate the importance of differentiating portfolio growth from passive and active reallocations first through simple graphs of various measures and then, in Section 4, through simple reduced-form regressions. Our goal here is not to provide a definitive explanation of what drives capital flows, but rather to illustrate the need to understand exactly what various measures can speak to.

Throughout we will use a quarterly dataset that covers the time period 2002 – 2012 for a set of nineteen countries: India, Indonesia, Korea, Malaysia, Philippines, Taiwan, and Thailand; Argentina, Brazil, Chile, Colombia, and Mexico; Czech Republic, Hungary, Poland, and Romania; and Israel, Turkey, and South Africa. For ease of exposition and because we do not want to introduce a new acronym, we will refer to the group as EMEs, even though at least two are clearly developed countries.

The first picture flows-based research must confront is Figure 1. Empirical work focused on flows often assumes, whether stated or not, that financial wealth is constant. Bohn and Tesar (1996) and Brennan and Cao (1997) recognized this, making clear that portfolio choice was made with respect to the size of the portfolio (financial wealth). Both controlled for changes in financial wealth by including a measure of U.S. equity returns in their regressions, but such control is imperfect. Financial wealth (Figure 1, thick line) is far from constant, evolving because of new savings (Figure 1, thin line), which maps directly into the Tille and van Wincoop (2010) concept of portfolio growth, as well as valuation changes on existing assets. Flows-based empirical work must recognize this fact highlighted by Tille and van Wincoop (2010).

Keeping in mind that financial wealth changes through time—portfolio growth occurs and is driving at least some of the capital flows one might want to study—we next turn to a pictorial tour of flow
measures. We focus on equity flows, not because we feel that equity flows are necessarily the most important type of flow, but because data availability for equities allows us to readily consider a range of measures from those that combine active reallocations with a passive component (flows due to an income effect or passive reallocations) to some that can isolate active reallocations.

3.1. Measures that Combine an Income Effect and Active Reallocations

Figure 2a shows that EME BOP equity inflows—that is, Rest of World inflows into recipient-country equities, whether scaled by recipient country GDP or market capitalization—surged after the GFC. This surge in flows occurred at the same time as the Fed’s QE policies—shown as bars depicting the size of LSAPs as a percent of US GDP—and appeared to have abated somewhat during pauses in QE, prompting many to wonder if QE led to EME inflows (e.g., Fratzcher et al (2012) and Moore et al (2013)). The surge is also observable in the more restricted EPFR mutual fund data on net flows into EME equities (Figure 2b).

In most datasets it is difficult to assess how flow analysis is impacted by the Tille and van Wincoop (2010) point that flows are in part passive (due to portfolio growth) and in part active (due to active portfolio reallocations). One dataset, though, that can allow us to make these distinctions is on U.S. investors’ flows to and portfolios in EME equities, about which we have very detailed information. So for the remainder of this section we will restrict our analysis to US flows. US flows to EMEs (Figure 2c) tell a similar story to the BOP flows. That is, whether one refers to BOP or US data, flows to EMEs seem to have increased during the QE period, suggesting that Fed policy led to massive switching from AEs to EMEs.

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10 As the availability of higher quality data improves over time, researchers can extend the analysis to other source countries.
However, equity inflows are due not only to active portfolio reallocations but also to passive ones due to portfolio growth (from new savings), so we cannot actually say anything about “switching” just by observing flows.

### 3.2 A Measure that Combines Passive and Active Reallocations

Another measure, portfolio shares (*US Share*)—shown in Figure 3 as both changes (top graph) and levels (bottom graph)—is immune to changes in the size of the portfolio. The weight of EMEs in US equity portfolios increased during QE (especially during QE1). While immune to changes in the size of the portfolio, portfolio shares still combine two components—portfolio shares can change because of active or passive reallocations—so Figure 3 doesn’t actually tell us whether US investors switched toward EME equities during QE1 or if this was just a passive increase in US portfolios (because EME equity markets could have outperformed without active reallocations).

### 3.3 A Measure that Isolates Active Reallocations

The relative weight measure can isolate active reallocations. In Figure 4 we depict the raw relative weight (eq. 5) and normalized relative weight (eq. 6) of EME equities in US investors’ portfolios. The relative weight measures appear to indicate that the QE-period increase of EME equities in US portfolios was due not to active reallocations but to passive ones. EMEs’ relative weight increased, but the normalized relative weight did not, indicating that the increase in raw relative weight was due to the strong performance of EME equity markets. The normalized relative weight measure is flat, suggesting that US investors did not actively increase portfolio allocations to EME equities (relative to the value-weighted benchmark). A comparison of raw and normalized relative weights also suggests that during the GFC the
decline of EME equities in US portfolios was due to valuation effects rather than active switching, as normalized relative weight fell only modestly in the second half of 2008.\textsuperscript{11}

In sum, different measures of capital flows measure different things. BOP and US flows show a surge of inflows into EME equities after the GFC, but flows conflate a passive component (from new savings allocated according to existing portfolio weights) with active portfolio reallocations. Changes in portfolio shares are immune to portfolio growth and do indeed measure portfolio reallocations, but those reallocations can also be both active and passive. The change in the normalized relative weight measure is the cleanest measure, as it is function of only one thing—active portfolio reallocations. Notably, US normalized relative weights in EME equities have not increased since the GFC, suggesting that the robust equity inflows experienced by EMEs and changes in portfolio weights were due more to portfolio growth (perhaps making up for the portfolio shrinkage during the GFC) and relative price changes rather than active reallocations.

4. The Many Forms in Regressions

Figures 2-4 showed that flows, portfolio shares, and a measure that focuses on active portfolio reallocations (relative weight) tell very different stories. We next show in simple reduced form regressions that the measures also lead to different conclusions about factors that drive capital flows. We will include some traditional factors; see, for example, the long-standing empirical literature on capital flows that focuses on push (global) and pull (local) factors, including the seminal papers Calvo, Leiderman and Reinhart (1993, 1996) and Chuhan, Claessens, and Mamingi (1998). We also include a capital controls measure; because no existing measure gets at the intensity of capital controls—necessary to gauge the

\textsuperscript{11} This is consistent with evidence from another asset class, EME local currency bonds. Burger et al (2015) finds that US investors did not actively switch out of EME local currency bonds during the GFC. But it also opens up the question, which we don’t consider here, of what caused the strong performance of EME equity markets.
impact of the small changes that many countries have been implementing—we create a new capital flow management measure.

The reader should note that our goal is not to provide a definitive explanation of capital flows but to use our regression analysis to illustrate that different measures tell different stories.

4.1 Possible Drivers of Capital Flows

We next describe four types of explanatory variables: standard push/pull factors such as differentials in growth, returns, and interest rates; a measure of exchange rate valuation; unconventional monetary policy by the Federal Reserve; and a new capital controls measure.

4.1.1 Standard Push and Pull Factors

The push-pull literature suggests a short list of possible proximate causes of equity flows to EMEs such as differentials in economic growth, returns, and local interest rates, all depicted in Figures 5 and 6.

Economic growth differentials—measured as the difference between four-quarter real GDP growth rates in each EME and an aggregate of AEs (Australia, Canada, the euro area, Japan, Sweden, UK, US)—have been persistent and at times sizeable. Aggregate real GDP growth in EMEs (Figure 5a, top red line) has consistently outpaced that in the AEs (the lower blue line), with the growth differential (the bars) recently fluctuating between a high of over 6 percent in late-2009 and early-2010 (reflecting EMEs’ faster pace of recovery from the crisis) and a low of less than 2 percent in early 2012 (when EME growth had slowed and AEs experienced a short-lived uptick in growth). Policy interest rate differentials (Figure 5b, bars)—computed as the difference between the nominal policy rate for each EME and the U.S. Federal Funds rate—have been positive but have fluctuated notably. During the post-crisis recovery, the differing cyclical positions of the EMEs and AEs called for different monetary policy settings, increasing the policy rate differential in 2010 and 2011.
Other possible proximate causes of equity flows to EMEs, shown in Figure 6a and 6b, are exchange rates and equity returns differentials, both of which affect potential investment returns. Some studies, such as Ghosh et al. (2014) and others, use deviations from long-run real effective exchange rates as a measure of over/under valuation of a currency and find that flows into a country increase when exchange rate measures suggest the currency is undervalued. The equity returns differential, the difference in the equity market return of the target country less that of the source country, is another measure of the relative attractiveness of a country. Because equity market returns have been found to be positively autocorrelated, investors may expect that past positive returns differentials predict future excess returns, increasing flows into that country.

An indicator of global risk appetite (or the lack thereof) is the VIX computed by the Chicago Board Options. The VIX, a measure of the implied volatility of the S&P 500 index, serves as a proxy for the combination of perceived risk and risk aversion. Indeed, Figure 6c shows that at times BOP flows to EMEs (the red line) have been correlated with the VIX index (the blue line, plotted on an inverted scale so that a movement in the upper direction represents more appetite for risk and less risk aversion). Capital flows to EMEs plunged during the investor panic after Lehman Brothers in 2008 and again as the European situation worsened in the second half of 2011 and in May 2012, although since 2013 changes in flows to EMEs have not been accompanied by corresponding changes in the VIX.

4.1.2 Unconventional Monetary Policy

Another possible driver of EME flows is the LSAP or QE program by the Federal Reserve. LSAPs can be measured many ways (Ahmed and Zlate, 2014). Indicator variables can be used to mark initial announcements and implementation periods of the first three rounds of LSAPs as documented by Gagnon et al. (2011), Krishnamurthy and Vissing-Jorgensen (2011) and Bauer (2012). Another approach is to use yields on 10-year U.S. treasury bonds, either actual (depicted in Figure 7a) or instrumented by actual net
asset purchases (the bars in Figure 7a) by the Federal Reserve. We choose this latter approach. Specifically, we follow Ahmed and Zlate (2014) and split the 10-year Treasury yield into two components: a yield estimated were there no LSAPs (green line in Figure 7b) and the component of the yield that may be due to LSAPs (red line). Specifically, in a first-stage regression we regress Treasury yields on one-quarter ahead Fed net asset purchases over the period from 2002:Q4 to 2013:Q2 (since the QE programs were announced ahead of implementation) and compute the LSAP component of yields as beta*LSAPs. The remaining yield is the non-LSAP component. For the period prior to the first QE program, we set the LSAP component to zero. In our capital flows regressions we include the two components simultaneously.

4.1.3 Capital Controls

Capital controls, long viewed with disfavor in the official international community, have undergone a reassessment. Their effectiveness is unclear—results based on the historical experience prior to 2009 generally suggest that capital controls have been more successful in altering the composition of flows to a country than in changing the aggregate volume, except perhaps in the very short run—but capital controls have recently become an oft-adjusted policy tool for EMEs.
Existing measures are not well suited for studying changes in capital controls because they are either available only at a low frequency (typically annually), or because they tend to be built from 0/1 indicators on whether controls exist or not, and thus do not capture much of the time variation in the intensity of restrictions. A standard example of the typical limitation is India, which has some sort of capital control across all categories and so would enter most measures as completely closed, whereas in reality (as we will show) India has steadily reduced its restrictions.

We create a new measure of capital flow management (CFM) restrictions—the number of CFM restrictions in place—that aims to address these limitations. We describe the measure in some detail in the appendix, but briefly our measure is a count, over the period from 2002 to 2012, of the number of steps countries undergo to put new restrictions in place, tighten or ease them, or remove them altogether.15 While still based on qualitative information about measures in place, each new measure is considered and added at the exact time it is implemented. The measure is available at a high frequency—it is entered as of implementation date and so can be used with daily data, if desired—and can be disaggregated by asset type (portfolio equity, portfolio bond, FDI, and banking/other). In terms of the Klein (2012) “gates and walls” distinction, our measure is of gates, in the sense that it captures the intensity of restrictions over time since a given start date for a given country and instrument rather than the level of long-standing controls (and so is more suitable for panel studies in which the initial level might be captured by country fixed effects).

Figure 8 depicts, for 18 countries from 2002 through 2012, the cumulative number of measures in place in any given quarter (the blue thick lines) and its first difference (the number of new measures

inflows. Magud, Reinhart, and Rogoff (2011) find that certain country-specific characteristics need to exist for capital controls to be effective and, thus, not surprisingly, some capital controls were effective and some not.

15 To form our measure, the main source of information is the qualitative narrative description in the “Changes during year” section of the IMF’s AREAER. We focus here on restrictions on non-residents’ gross inflows into EMEs. Using the same methodology and data sources the measure could be extended to cover the residents’ gross capital outflows.
introduced in a quarter, the red thin lines). The measure’s ability to capture gates but not walls is readily apparent. That Malaysia, for example, had some level of controls at the beginning of the sample is not captured by our measure, but its subsequent steps to relax controls are evident. Another example is Brazil. The measure captures Brazil’s imposition of a 2-percent tax on foreigners’ investments in fixed income in October 2009, the subsequent two-step tightening (when the tax was raised to 4 percent and then to 6 percent by October 2010) and the removal of the tax in June 2013.\textsuperscript{16} Details on the types of controls implemented by selected countries are in Table 2.

That our new CFM measure captures something fundamentally different than existing measures—the small changes in capital controls that many countries are currently contemplating or have been implementing—is evident from a comparison with the Fernandez et al (2015, FKRSU) measure. Figure 9 shows both measures for one country (Brazil). On restrictions on equity and bond inflows, for instance, the FKRSU measure captures the initial imposition of a 2-percent tax on the value of foreigners’ portfolio investments in October 2009, but does not reflect the subsequent two-step increase in the tax on equity inflows (to 6 percent in October 2010), its expanded coverage to include margin deposits for security derivatives, or the cuts in the tax in January and December 2012. Similarly, the tax on bond inflows was raised to 6 percent in October 2010, but its coverage was narrowed in December 2011.\textsuperscript{17} Due to the annual frequency of FKRSU, the measure also assigns a certain degree of restrictiveness to the entire year even as the new restriction is introduced late in the year (such as the initial tax on portfolio inflows in October 2009). On banking inflow restrictions, the corresponding FKRSU measure switches from 0 (no restrictions) to 1 (restrictions) in 2008, when certain types of foreign loans became subject to a tax, but our measure also shows the many subsequent adjustments to the CFMs pertaining to banking inflows.

\textsuperscript{16} Brazil’s removal of the tax effectively reversed three tightening steps and is coded as such to maintain consistency over time for a given country.

\textsuperscript{17} In December 2011, bond inflows in infrastructure and research and development projects were exempted from the tax. Eventually, the tax on bond inflows was removed in June 2013, which is beyond the end of our sample.
(some relaxing restrictions, others tightening). The FRKSU measure is state of the art as far as 0/1 indicators go, but cannot capture the smaller changes that many countries have been implementing.

An important question for capital flow research is whether capital controls measures can be considered exogenous in regressions of flows. We do not aim to definitively answer this question here, but note that Fernandez, Rebucci, and Uribe (2015) find that annual capital controls measures are remarkably acyclical with respect to output, the current account or the real exchange rate. Our measure is higher frequency and better captures small changes, so it might be better suited to pick up cyclicality. Because policymakers may well be reacting to capital flows when altering capital controls, as a check we regress the number of new measures implemented in a given quarter on current and lagged flow variables as well as other variables suggested by the literature (Table 3). There appears to be a structural break in the behavior of CFMs from pre- to post-crisis. In the full sample (Panel A), nothing is significant, similar to the Fernandez, Rebucci, and Uribe (2015) acyclicity result. But prior to the crisis (Panel B), EMEs implemented capital controls when their economic growth was low relative to AE growth, and after the crisis (Panel C) EMEs implemented capital controls amid currency appreciation pressures. In summary, while in subsamples our CFM measure does seem to react to exchange rate pressure and growth differentials—contrary to the strong acyclicity results in Fernandez, Rebucci, and Uribe (2015)—in no sample do we find that flows are leading to changes in CFMs. This suggests that at least for the purpose of this paper CFMs can enter our flows regressions as exogenous factors.

4.2 Regression Results

The results of our regressions on the various capital flow measures are in Table 4, which we divide into four panels. The dependent variables in Panels A (BOP equity inflows) and B (US equity inflows) are measures that combine the income effects with active reallocations. In those panels, the main story is
of VIX. In all samples (full, pre-GFC, post-GFC), a lower VIX is associated with more equity inflows to EMEs. For BOP flows (Panel A), past returns differentials are also significant, more so when flows are scaled by GDP rather than market capitalization. In the full sample the variable capturing the LSAPs effect on 10-year Treasury yields is negative and significant, suggesting that the more LSAPs decreased US 10-year yields, the greater were BOP flows into EME equities. Interestingly, this LSAP result is not evident in US flows (Panel B), suggesting that during QE episodes non-US foreign investors increased their flows to EMEs. The number of capital controls (CFM) has significant negative effect on BOP flows, especially in the post crisis period, but again not on US flows, suggesting that investors outside of the US avoided new equity investment in countries with capital control measures. Finally, in the post-crisis period larger policy rate differentials were associated with more US flows.

The dependent variables in Panel C (changes in US portfolio shares and raw relative weight) are stock-based measures that omit portfolio growth but still have two components: active reallocations and passive reallocations (due to relative price changes). Note too that the portfolio shares in Panel C are defined in two ways. “Foreign” includes only the non-US equity portfolio and so captures changes within US investors’ foreign equity portfolio (between, for example, EMEs and AEs). “Global” includes non-US and US equities and so also includes changes between the US and non-US components.

The portfolio share regressions in Panel C show that after a quarter in which an EME experiences high returns its share in US portfolios increases; the coefficient on the past quarter’s returns differentials is always significant. Strikingly, VIX is rarely significant; comparing this with the flows results of Panels A and B suggest that VIX is capturing more portfolio growth than reallocations. We again see a negative and significant coefficient on the LSAPs component of 10-year Treasury yields, more so when considering the global portfolio, suggesting LSAPs were associated with increased weightings on EME vs. US equities. Notably, for portfolio share measures CFMs are negative and significant in the post-GFC period,
suggesting that the tightening of capital controls was associated with decreasing shares in US portfolios. Whether the decreased shares associated with tighter capital controls was due to active trading away from the EME or just a passive reduction (due to relative price changes) is not discernable from Panel C’s portfolio share results (or with any dependent variable that includes the passive reallocation component).

Panel D uses the normalized relative weight measure that isolates active reallocations. Lagged returns differentials lose much (but not all) of their significance, suggesting that the strong significance of lagged returns in Panel C is due in part to some persistence in returns differentials. Lower 10-year yields are associate with greater weight on EME equities, while VIX, LSAPs, and CMFs do not have a statistically significant effect. However, in the post-crisis period, growth differentials and policy rate differentials, as well as lagged equity return differentials—all variables that are connected to economic fundamentals—are marginally significant.

The simple regressions in Table 4 highlight that different forms of flows yield different conclusions. We note here three variables of recent interest: the VIX, LSAPs, and capital controls. VIX is highly significant in flows regressions but less so for portfolio reallocations and not at all for active reallocations, suggesting that VIX is mainly capturing flows due to new savings. LSAPs are significant in regressions with flows and portfolio shares, suggesting they may have affected flows to EMEs similarly through passive rather than active reallocations, but become insignificant when the normalized relative weight is used. For CFMs, that they are significant when a measure that includes a passive component is used but not when active changes are isolated suggests that CFMs affect flows through changing relative prices rather than active reallocations. For active reallocations into EME equities, the one variable that has a consistent impact is the level of US long-term interest rates, a result as old as this literature (see, for example, Calvo et al 1993, albeit for a different maturity). Lately, however, in the post-crisis period, growth differentials and policy rate differentials also appear to be marginally significant.
5. Active Reallocations Across Asset Classes

Our analysis of active portfolio changes has been on within-asset-class reallocations. The benchmark was the global equity market and the portfolio considered was U.S. investors’ global equity portfolio. As such, our analysis had nothing to say about switching between asset classes (for example, from bonds to equities) or within other asset classes. But the relative weight measure can be constructed using total financial assets as the benchmark. That is, while our focus remains on EME19 equities, the comparators are the U.S. portfolio measured by all U.S. financial assets (line 9 of Flow of Funds table B.100) and global financial assets (provided by McKinsey Global Institute), such that normalized relative weight will capture US investors’ active switching from EME19 equities to other equities and other asset classes. Even considering all asset classes, normalized relative weight is quite flat: Figure 10 suggests that U.S. flows to EME equities have been in line with those markets’ increased importance in global markets.

6. Conclusion

Many forms of international capital flows are used in the literature. Underappreciated is that these different forms can conflate active portfolio reallocations with a passive component that is due to either the allocation of new savings according to old portfolio weights (in flows data) or passive portfolio reallocations from relative price changes (in portfolio shares data). We form a portfolio-based measure (normalized relative weight) that isolates the active portion and show in a series of simple pictures and reduced-form regressions that the different forms yield very different stories. Our results indicate that researchers should be exceedingly careful when selecting a flow measure to analyze the underlying drivers of flows. Our graphical results showed that the post-GFC surge in inflows into EME equities is apparent

18 Burger et al. (2015), a within-asset-class study of local currency bonds, shows that over the 2007-2011 period U.S. investors switched out of US bonds and into local currency foreign bonds, especially EME bonds.
in flows and portfolio allocations (two measures that conflate a passive component with active reallocations) but not in the relative weight measure that isolates active portfolio reallocations. This suggests that the robust inflows experienced by EMEs were due more to portfolio growth than active reallocations between EME equities and other equities. Our simple regressions, which focus on the determinants of flows, also suggest that VIX, QE and CFMs seem more related to passive reallocations rather than active reallocations. Active reallocations appear to be related primarily to an age-old determinant: the level of US long-term interest rates.

While we are confident that the stock-based normalized relative weight measure isolates active portfolio reallocations, we are less sure that there is a clean way to differentiate between the active and passive components in flow-based measures. That said, an interesting path for future research is to take into account that flows have two components and revisit much of what we have learned about capital flows. For example, we hear that flows are procyclical and volatile. Overall flows may well be procyclical, but is that just due to the passive component? Is the active component procyclical? Is flow volatility due to the active portion (which is likely) or the passive component? EMEs on the receiving end of flows should recognize that as a group they will receive about $20 billion of US equity flows per year just from new savings allocated according to last year’s portfolio weights.19 The sudden stops literature is likely by design picking up the active portion of flows, but any study of flows in normal periods comingle active and passive.

Another implication of our work is that a better understanding of flows requires data on stocks. An example with official U.S. data is that going forward we may well learn more about flows from the new monthly data on positions. The only aspect that requires effort is coming up with reasonable measures of returns, something that is difficult but feasible.

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19 This calculation is for the 19 countries in our sample. For all foreign equities, passive US flows defined this way (new savings allocated at last year’s weights) are running at about $100 billion annually.
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Data Appendix

Our working sample of 19 countries includes India, Indonesia, Korea, Malaysia, Philippines, Taiwan, and Thailand; Argentina, Brazil, Chile, Colombia, and Mexico; Czech Republic, Hungary, Poland, and Romania; and Israel, Turkey, and South Africa.

“LSAP” is the change in Federal Reserve holdings of securities (scaled by GDP) starting the in LSAP period of 2008Q3, zero otherwise. Fed securities holdings are from the Fed’s H.4.1 release (http://www.federalreserve.gov/releases/h41/).

“10-year Treasury LSAP” is the estimated effect of LSAPs on 10-year Treasury yields.

“10-year Treasury non-LSAP”, calculated as the 10-year Treasury yield minus “10-year Treasury LSAP”, is the level of the 10-year Treasury yield in the absence of LSAPs.

CFM measures are constructed by the authors, as described in the text and appendix. The data are posted at http://faculty.darden.virginia.edu/warnockf/ACWZ_CFM_Feb2015.xlsx.

Exchange rate valuation is computed as the percent deviation of the quarterly real effective exchange rate (REER) from the average level of the previous five years. Higher values are associated with a more overvalued exchange rate.

GDP growth differential is the difference in real GDP growth rates between the EME country and an aggregate of advanced economies.

The policy rate differential is the difference in policy rates between the EME country and the US.

Country level GDP and policy rates from Global Financial Data.

VIX is from Bloomberg. Higher values indicate increased expected volatility and/or risk aversion.

Flows vis-à-vis Rest of the World (ROW):

BOP flows, from the IMF, provide data on the dollar amount of flows (gross and net, by major flow type) between the reporting country and ROW. We scale BOP flows by either reporting country nominal GDP (in USD, from Global Financial Data) or local equity market capitalization. Note that the IMF’s change from BPM5 to BPM6 required us splice the now discontinued BPM5 series with the new BPM6 (which only begin in 2006).

US flows to and positions in EME equities:


Equity market capitalization data are from Bloomberg, Datastream and http://www.world-exchanges.org/.

We use the following eight flow measures as dependent variables:

BOP Equity Inflows: BOP Gross Equity Inflows, scaled by local GDP or local market capitalization.

USEqFlows: US flows into local equities, scaled by local GDP or local market capitalization.

USPortShare_Global: The share of local equities in US global equity portfolios (first differenced)

USPortShare_Foreign: The share of local equities in US foreign equity portfolios (first differenced)

RelWgt_Global: The weight of local equities in US investors’ global equity portfolio divided by their weight in global market capitalization (first differenced)

Normalized RelWgt_Global: RelWgt_Global normalized by the relative weight on home equities (first differenced)
Appendix on Capital Controls

As noted in Schindler (2009), most measures of capital controls face a trade-off, whereby it is difficult to describe the nature of restrictions consistently across a broad set of countries and over long time interval. For example, the index of capital account openness in Chinn and Ito (2008) covers as many as 182 countries from 1970 to 2006, but relies on binary indicators provided in the summary tables of IMF’s Annual Report on Exchange Agreements and Exchange Restrictions (AREAER). The measure does not capture time-varying changes in the intensity of restrictions nor distinguish by asset type, resident status, or the direction of flows. Also using binary data from the AREAER summary tables, Schindler (2009) constructs a measure of capital controls for 91 countries over 1995-2005 and distinguishes by asset type, resident status, and the direction of flows; however, conditional on restrictions being in place, the measure does not capture the time-varying intensity of such restrictions. The Quinn (1997) and Quinn, Schindler, and Toyoda (2011) measure does captures the time-varying intensity of restrictions, albeit only at the annual frequency. Covering 122 countries over almost six decades, the authors augment binary data from the AREAER summary tables with qualitative descriptions from the report to summarize restrictions and gauge their intensity for six types of international transactions, although the measure does not distinguish by asset type or the direction of capital flows. A recent effort that extends and codifies the Schindler (2009) measure is Fernández et al. (2015).

All of the above mentioned are annual and most do not capture the time-varying intensity of capital controls, limiting their usefulness in studies of capital flows. Ahmed and Zlate (2014) presents for a small set of countries and short time span a higher frequency (quarterly) measure that aims to capture the time-varying intensity of CFM restrictions. Our measure builds on Ahmed and Zlate (2014), extending it across a number of dimensions (time, number of countries, and number of asset classes).

Our measure—a count of the number of steps that countries undergo put new restrictions in place, tighten or ease them, or remove them altogether—is built from the qualitative narrative descriptions in the “Changes during year” sections of the IMF’s AREAER, for restrictions on “Capital transactions” and “Provisions specific to the financial sector”. Steps to impose or tighten restrictions are entered with a positive sign and those to ease or remove restrictions are entered with a negative sign. The cumulative count of the number of steps undertaken by each country since the beginning of the sample measures “the number of CFM restrictions in place,” with higher values indicating greater restrictiveness. We construct the measure by asset type for 19 countries for the period 2002-2012 and, while we focus on gross capital inflows, a measure for gross capital outflow restrictions could be readily constructed.

The measure is designed to account for the time-varying incidence and intensity of capital flow management (CFM) restrictions at a higher frequency. In terms of the Klein (2012) gates and walls, our measures are of gates, in a sense that we account for the time-varying intensity of restrictions rather than for long-standing controls on capital flows for each country. The new measures are entered as of implementation date and so can be used with daily data, if desired. For our purposes we focus on a quarterly frequency. The measure is also disaggregated by asset type (portfolio equity, portfolio bond, FDI, and banking/other) and so can be used for a wide range of purposes.

Two caveats apply to our measure. While it allows to compare the intensity of capital controls over time for a given country and instrument, it is less able to compare intensity across countries due to the heterogeneity in capital control instruments. Also, the cumulative measure of CFM restrictions is dependent on the initial level of restrictiveness in each country, so it is more suitable for panel studies in which the initial level can be captured by country fixed effects.

For capital inflows, our methodology for coding CFM measures considers measures that tighten or loosen:
• Restrictions on FDI, which may be sector-specific or not.
• Taxes on FDI, portfolio, or banking inflows, or on the profits that foreigners obtain from such investments.
• Restrictions on the asset types that foreigners can purchase (e.g., restrictions on foreigner’s purchases of certain types of government bonds, or on purchases of bonds beyond a certain fraction of the total issuance, etc.).
• Minimum stay requirements for foreign investments, or penalties on the early sale of assets or redemptions of profits.
• Restrictions on foreigners’ purchases of foreign exchange for the repatriation of investments and profits, and restrictions on residents’ purchases of foreign exchange for the repayment of loans and interest to non-residents (e.g., the approval requirement from Argentina’s central bank).
• Reserve requirement (RR) on FDI or portfolio inflows to be held at the central bank for a minimum period of time, with penalty for early withdrawal.
• Taxes, restrictions, or RR on banks’ or firms’ FX liabilities, or on foreigners’ bank deposits denominated in local currency, which may be differentiated by maturity.
• Taxes, restrictions, or RR on banks’ FX derivative positions (e.g., caps on banks’ short/oversold, long/overbought, or net open positions in the FX market relative to capital, which affect the size of the FX portion of banks’ balance sheet, and hence the capital inflows).
• Remuneration on RR for banks’ FX deposits, or RR on foreigners’ bank deposits denominated in local currency (more remuneration encourages inflows).
• Restrictions on residents’ borrowing or issuance of bonds denominated in FX (e.g., a ban on FX borrowing if the intent is to convert the proceeds in local currency in Korea).
• Taxes, restrictions or RR on firm’s FX derivatives (e.g., caps firms’ use of FX derivatives relative to export revenues).

Examples of actions we do not consider CFM events include macroprudential measures for the banking sector, such as capital requirements, risk weights, etc.; RR on banks’ local currency deposits that do not discriminate against foreigners’ deposits; measures addressing banks’ maturity mismatches between FX assets and liabilities (e.g., banks must match a minimum fraction of their long-term FX assets with long-term FX liabilities), setting higher loss provisioning requirement for FX loans, or setting lower caps for the loan-to-value or debt-to-income ratios for FX loans; and restrictions on foreigners’ ability to purchase real estate.

Types of measures vary by country (Table 2). First, authorities in a number of countries have modified their treatment of inward foreign direct investment (FDI) over time, with most of them having loosened restrictions at least in recent years (column 1).

Second, among the measures restricting portfolio inflows (column 2), authorities have recently imposed or adjusted taxes on investments by foreigners. Such taxes apply to the total volume of inflows (Brazil) or to the foreign investors’ income from holding local government bonds (Korea and Thailand).

Third, authorities have imposed a number of restrictions on foreign investments in certain types of asset classes or maturities, as well as on foreigners’ ability to repatriate the principal or profits from such investments (column 3). These measures can take the form of caps on the share of foreigners’ own portfolios that can be invested in certain types of assets (e.g., Taiwan in 2009 and 2010, for holdings of time deposits and government bonds), caps on the share of outstanding domestic assets that can be held by foreign investors (e.g., Colombia in 2002), or strict reporting requirements for foreign investors in certain asset classes (e.g., Israel in 2011, for holdings of short-term bills issued by the government or the central bank). In addition, measures restricting the repatriation of foreign investments or profits include
outright bans on the purchases of foreign currency (e.g., Argentina) or minimum holding requirements (e.g., Colombia in 2004 banned foreigners from repatriating portfolio investments within one year from the date of investment; Argentina in 2005 required foreigners to hold incoming capital in the country for up to one year; Indonesia in 2010 and 2011 required investors to hold their short-term central bank bills for up to six months).

Fourth, some countries—for example, Argentina in 2005, Colombia in 2007, and Thailand in 2006—instituted reserve requirements that force foreigners to hold a certain fraction of their portfolio investments at the central bank, often in unremunerated accounts and with penalty for early withdrawal (column 4). Most of these restrictions were subsequently reversed (although not Argentina’s).

Fifth, to restrict banking inflows, countries have used taxes on external borrowing, often with higher rates imposed on shorter-term loans (column 5). For example, this was the case in Brazil in 2008; the tax was revived in 2011 and 2012, but has since been partially reversed.

Sixth, there are limits on banks’ exposure to external liabilities (column 6). Among these, a special type of measure limits banks’ and firms’ exposure to foreign exchange derivatives, in part to reduce the short-term external debt that banks would use to hedge these derivatives. This type of measure was imposed in Colombia, Indonesia, Korea and Thailand even before the GFC.

Finally, a number of EMEs have increased the required reserves on banks’ liabilities denominated in foreign currencies or on external liabilities disproportionately more than otherwise (column 7).

Our CFM data are posted online.
Figure 1: U.S. Financial Wealth and Cumulated Savings (in trillions of US dollars)

Note: Cumulated savings (the thin lower line) are cumulated starting from the 1985 level of financial wealth. Source: FRB’s Financial Accounts of the United States (Z.1 report)
Figure 2. Equity Flows to EMEs

Figure 2a. BOP Gross Equity Inflows into EMEs

Figure 2b. EPFR Flows to EMEs from Equity Funds

Figure 2c. US Gross Equity Flows to EMEs

Notes: See the Data Appendix for variable definitions.
Figure 3. Share of EME Equities in US Equity Portfolios (in percent) and QE

Notes: See the Data Appendix for variable definitions.
Figure 4. Relative Weight of EME Equities in US Portfolios

Figure 4a. Relative Weight of EME Equities in US Portfolios (Changes)

Figure 4b. Relative Weight of EME Equities in US Portfolios (Levels)

Notes: See the Data Appendix for variable definitions.
Figure 5: Possible determinants of flows to EMEs (I)

(a) Real GDP

Sources: Haver Analytics for quarterly real GDP (expressed as the 4-quarter percent change) and the nominal policy interest rates; IMF for flows; and Bloomberg for VIX.
Figure 6: Possible determinants of flows to EMEs (II)

Returns differentials and ER measure

(a) Aggregate EME Real Effective Exchange Rate*

(b) Equity returns

(c) VIX

*The EMEs include: India, Indonesia, Korea, Malaysia, the Philippines, Turkey, Thailand, Argentina, Brazil, Chile, Colombia, Mexico, Israel, Turkey, South Africa, Czech Republic, Hungary, Poland, and Romania. EME average weighted by WEO GDP (PPP).
Figure 7: LSAPs

Notes: In Panel A, net asset purchases are obtained as the change in the end-of-quarter total holdings of agency debt securities, mortgage-backed securities, and U.S. Treasury securities by the Federal Reserve. Sources: Bloomberg (for the Treasury bond yield) and the Federal Reserve (for asset purchases). In Panel B, the yield due to LSAPs is estimated by regressing yields on LSAP purchases.
Figure 8: Number of capital control measures introduced in EMEs since 2002

- Measures introduced each quarter
- Cumulative measures

Argentina

Brazil

Chile

Colombia

Czech Republic

Hungary

India

Indonesia

Israel
Figure 8 (cont.): Number of capital control measures introduced in EMEs since 2002

- Measures introduced each quarter
- Cumulative measures

**Korea**

**Malaysia**

**Mexico**

**Phillippines**

**Poland**

**Romania**

**South Africa**

**Taiwan**

**Thailand**

**Turkey**
Figure 9: A Comparison of CFM Measures for Brazil

Total inflows

Equity inflows

Bonds inflows

Banking inflows

Notes. Graphed are our measure and that of Fernandes et al (2015, FKRSU).
Figure 10: U.S. Relative Weight for EME19 Equities based on All Financial Assets
Table 1: Relative Weight Examples

The table shows a baseline Period 1 allocation across three markets (US, which is the home market; AE; and EME) and four scenarios for Period 2. All scenarios should be compared to the Period 1 baseline. In (a), new US savings are allocated proportionately across all markets, pushing up all prices by 5%; capital flows occur, but portfolio weights and relative weights do not change. Scenario (b) also has US new savings allocated proportionately, but prices increase relatively more in EMEs; portfolio weights change, raw relative weight changes slightly, but normalized relative weight is unchanged. Scenario (c) has active reallocations from US and AE equities to EME equities, which increases EME relative prices; these active flows result in increased portfolio weights and relative weights in EMEs, and decreased weights in AEs. Scenario (d) begins with relative price changes (increase in EME prices) that would increase the weight of EMEs in US portfolios, but active rebalancing (selling EMEs) keeps portfolios weights constant; relative weights adjust from this active rebalancing.

<table>
<thead>
<tr>
<th>Country</th>
<th>Period 1</th>
<th>(a) Portfolio Growth</th>
<th>(b) Portfolio Growth + Relative Price Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prices P</td>
<td>Home</td>
<td>AE</td>
</tr>
<tr>
<td>Prices P</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Holdings H</td>
<td>0.60</td>
<td>0.30</td>
<td>0.10</td>
</tr>
<tr>
<td>Quantity (Supply) Q</td>
<td>1.00</td>
<td>1.00</td>
<td>0.50</td>
</tr>
<tr>
<td>Assets (A=P*H)</td>
<td>0.60</td>
<td>0.30</td>
<td>0.10</td>
</tr>
<tr>
<td>MktCap (MC=P*Q)</td>
<td>1.00</td>
<td>1.00</td>
<td>0.50</td>
</tr>
</tbody>
</table>

Global Portfolio as Benchmark

| Portfolio Weight (Ai/sumAi) | 0.60 | 0.30 | 0.10 | 0.60 | 0.30 | 0.10 | 0.59 | 0.30 | 0.11 |
| Wgt in World Mkt (MCi/sumMCi) | 0.40 | 0.40 | 0.20 | 0.40 | 0.40 | 0.20 | 0.39 | 0.39 | 0.21 |

RelWgt

| Global or RW(US, i) | 1.50 | 0.75 | 0.50 | 1.50 | 0.75 | 0.50 | 1.51 | 0.76 | 0.50 |
| NormRW(US,i) | 0.500 | 0.333 | | 0.500 | 0.333 | | 0.500 | 0.333 |

(c) Active Reallocations

| Prices P | 0.95 | 0.95 | 1.1 | 0.9 | 0.9 | 1.2 |
| Holdings H | 0.55 | 0.25 | 0.20 | 0.61 | 0.31 | 0.08 |
| Quantity (Supply) Q | 1.00 | 1.00 | 0.50 | 1.00 | 1.00 | 0.50 |
| Assets (A=P*H) | 0.52 | 0.24 | 0.22 | 0.55 | 0.28 | 0.10 |
| MktCap (MC=P*Q) | 0.95 | 0.95 | 0.55 | 0.90 | 0.90 | 0.60 |

Global Portfolio as Benchmark

| Portfolio Weight (Ai/sumAi) | 0.53 | 0.24 | 0.22 | 0.60 | 0.30 | 0.10 |
| Wgt in World Mkt (MCi/sumMCi) | 0.39 | 0.39 | 0.22 | 0.38 | 0.38 | 0.25 |

RelWgt

| Global or RW(US, i) | 1.38 | 0.63 | 1.00 | 1.59 | 0.80 | 0.42 |
| NormRW(US,i) | 0.455 | 0.727 | | 0.504 | 0.262 |
Table 2: CFM measures introduced in EMEs since 2002

<table>
<thead>
<tr>
<th>Country</th>
<th>Restrictions on FDI</th>
<th>Tax on foreign investments</th>
<th>Restrictions by asset, maturity, holding period, or repatriation</th>
<th>Required reserves on foreign investments</th>
<th>Tax on external borrowing</th>
<th>Quantitative limits on banks/firms’ FX exposure</th>
<th>Required reserves on FX liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chile</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Czech Rep.</td>
<td>2008 Sep</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hungary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Israel</td>
<td></td>
<td></td>
<td>2011 Jul</td>
<td>2011 Jul (D) 2011 Jan (D)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaysia</td>
<td>2003 Jun</td>
<td>2002 Dec</td>
<td></td>
<td>2005 Apr</td>
<td></td>
<td></td>
<td></td>
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</table>

COMMENTS WELCOME
<table>
<thead>
<tr>
<th>Country</th>
<th>Restrictions on FDI</th>
<th>Restrictions on portfolio flows</th>
<th>Restrictions on banking flows</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Romania</td>
<td></td>
<td></td>
<td>2003 Jun 2005 Sep 2007 Jan, Jun (D)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Africa</td>
<td></td>
<td></td>
<td>2007 Feb (D) 2011 Oct (D)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors’ calculations from the IMF’s AREAER reports. Notes: For each country and type of measure, the dates in red/bold denote the introduction of new restrictions on inflows, whereas dates in black/regular denote measures that remove such restrictions. “(D)” denotes measures affecting banks’ FX derivatives positions.
**Table 3. Capital Flow Management Measures**

Dependent variable is the cumulative amount of capital flow management measures. Other variables, and the 21 EMEs included, are listed in the Data Appendix. Regressions include country fixed effects. Standard errors, computed using clustering at the country level, are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

a. Full Sample Period (2002q1-2012q4)

<table>
<thead>
<tr>
<th>Flow variable:</th>
<th>(1) Total Net Inflows</th>
<th>(2) Portfolio Net Inflows</th>
<th>(3) Other Net Inflows</th>
<th>(4) Total Gross Inflows</th>
<th>(5) Portfolio Gross Inflows</th>
<th>(6) Other Gross Inflows</th>
<th>(7) Bond+Bank Inflows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Variable</td>
<td>0.016</td>
<td>-0.011</td>
<td>0.133</td>
<td>0.001</td>
<td>0.017</td>
<td>-0.515</td>
<td>-0.367</td>
</tr>
<tr>
<td>(0.018)</td>
<td>(0.020)</td>
<td>(1.937)</td>
<td>(0.008)</td>
<td>(0.022)</td>
<td>(1.365)</td>
<td>(1.914)</td>
<td></td>
</tr>
<tr>
<td>Flow Variable (lagged)</td>
<td>0.016</td>
<td>-0.016</td>
<td>1.570</td>
<td>-0.006</td>
<td>0.011</td>
<td>-0.619</td>
<td>0.397</td>
</tr>
<tr>
<td>(0.016)</td>
<td>(0.025)</td>
<td>(2.384)</td>
<td>(0.006)</td>
<td>(0.018)</td>
<td>(1.345)</td>
<td>(1.772)</td>
<td></td>
</tr>
<tr>
<td>ER deviation from PPP</td>
<td>-3.344</td>
<td>-2.992</td>
<td>-3.180</td>
<td>-0.724</td>
<td>-3.195</td>
<td>-0.738</td>
<td>0.410</td>
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<tr>
<td>Growth Differential (EME-AE)</td>
<td>-0.083</td>
<td>-0.070</td>
<td>-0.075</td>
<td>-0.073</td>
<td>-0.073</td>
<td>-0.072</td>
<td>-0.024</td>
</tr>
<tr>
<td>(0.056)</td>
<td>(0.050)</td>
<td>(0.054)</td>
<td>(0.059)</td>
<td>(0.052)</td>
<td>(0.060)</td>
<td>(0.039)</td>
<td></td>
</tr>
<tr>
<td>Policy Rate Differential (EME-US)</td>
<td>-0.032</td>
<td>-0.034</td>
<td>-0.034</td>
<td>0.021</td>
<td>-0.035</td>
<td>0.021</td>
<td>0.047</td>
</tr>
<tr>
<td>(0.069)</td>
<td>(0.069)</td>
<td>(0.070)</td>
<td>(0.049)</td>
<td>(0.070)</td>
<td>(0.048)</td>
<td>(0.050)</td>
<td></td>
</tr>
<tr>
<td>LSAP</td>
<td>-0.031</td>
<td>-0.031</td>
<td>-0.031</td>
<td>-0.036</td>
<td>-0.034</td>
<td>-0.036</td>
<td>-0.013</td>
</tr>
<tr>
<td>(0.020)</td>
<td>(0.020)</td>
<td>(0.020)</td>
<td>(0.024)</td>
<td>(0.021)</td>
<td>(0.024)</td>
<td>(0.013)</td>
<td></td>
</tr>
<tr>
<td>VIX</td>
<td>-0.004</td>
<td>-0.008</td>
<td>-0.007</td>
<td>-0.018</td>
<td>-0.002</td>
<td>-0.018</td>
<td>-0.013</td>
</tr>
<tr>
<td>(0.007)</td>
<td>(0.011)</td>
<td>(0.009)</td>
<td>(0.013)</td>
<td>(0.009)</td>
<td>(0.013)</td>
<td>(0.013)</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>919</td>
<td>917</td>
<td>919</td>
<td>903</td>
<td>919</td>
<td>903</td>
<td>872</td>
</tr>
<tr>
<td>adj. R-sq</td>
<td>0.638</td>
<td>0.638</td>
<td>0.638</td>
<td>0.624</td>
<td>0.638</td>
<td>0.624</td>
<td>0.713</td>
</tr>
</tbody>
</table>
b. Pre-Crisis (2002q1-2008q2)

<table>
<thead>
<tr>
<th>Flow variable:</th>
<th>Total Net Inflows</th>
<th>Portfolio Net Inflows</th>
<th>Other Net Inflows</th>
<th>Total Gross Inflows</th>
<th>Portfolio Gross Inflows</th>
<th>Other Gross Inflows</th>
<th>Bond+Bank Inflows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Variable</td>
<td>-0.004</td>
<td>0.031</td>
<td>-3.826</td>
<td>-0.005</td>
<td>0.025</td>
<td>-2.707</td>
<td>-3.046</td>
</tr>
<tr>
<td>Flow Variable (lagged)</td>
<td>-0.004</td>
<td>-0.015</td>
<td>-0.305</td>
<td>-0.009</td>
<td>-0.020</td>
<td>-0.690</td>
<td>1.694</td>
</tr>
<tr>
<td>ER deviation from PPP</td>
<td>-2.706</td>
<td>-2.770</td>
<td>-2.246</td>
<td>-2.181</td>
<td>-2.769</td>
<td>-1.771</td>
<td>-3.640**</td>
</tr>
<tr>
<td>Growth Differential</td>
<td>-0.113**</td>
<td>-0.117**</td>
<td>-0.110**</td>
<td>-0.111**</td>
<td>-0.115*</td>
<td>-0.109*</td>
<td>-0.085*</td>
</tr>
<tr>
<td>Policy Rate Differential</td>
<td>-0.007</td>
<td>-0.007</td>
<td>-0.006</td>
<td>-0.006</td>
<td>-0.007</td>
<td>-0.003</td>
<td>-0.015</td>
</tr>
<tr>
<td>LSAP</td>
<td>0.058</td>
<td>0.058</td>
<td>0.056</td>
<td>0.060</td>
<td>0.058</td>
<td>0.063</td>
<td>-0.018</td>
</tr>
<tr>
<td>VIX</td>
<td>0.041</td>
<td>0.043</td>
<td>0.044</td>
<td>0.041</td>
<td>0.043</td>
<td>0.042</td>
<td>0.018</td>
</tr>
<tr>
<td>N</td>
<td>546</td>
<td>545</td>
<td>546</td>
<td>546</td>
<td>546</td>
<td>546</td>
<td>519</td>
</tr>
<tr>
<td>adj. R-sq</td>
<td>0.618</td>
<td>0.620</td>
<td>0.622</td>
<td>0.619</td>
<td>0.619</td>
<td>0.620</td>
<td>0.605</td>
</tr>
</tbody>
</table>

c. Post-Crisis (2009q3-2012q4)

<table>
<thead>
<tr>
<th>Flow variable:</th>
<th>Total Net Inflows</th>
<th>Portfolio Net Inflows</th>
<th>Other Net Inflows</th>
<th>Total Gross Inflows</th>
<th>Portfolio Gross Inflows</th>
<th>Other Gross Inflows</th>
<th>Bond+Bank Inflows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Variable</td>
<td>-0.036*</td>
<td>-0.025</td>
<td>-1.810</td>
<td>-0.004</td>
<td>-0.029*</td>
<td>-0.649</td>
<td>-1.970*</td>
</tr>
<tr>
<td>Flow Variable (lagged)</td>
<td>-0.030</td>
<td>-0.023</td>
<td>-1.662</td>
<td>-0.011</td>
<td>-0.028*</td>
<td>-1.364</td>
<td>-1.857*</td>
</tr>
<tr>
<td>ER deviation from PPP</td>
<td>17.123**</td>
<td>15.942**</td>
<td>15.817**</td>
<td>14.782**</td>
<td>16.194**</td>
<td>14.896**</td>
<td>15.666**</td>
</tr>
<tr>
<td>Growth Differential</td>
<td>-0.066</td>
<td>-0.063</td>
<td>-0.074</td>
<td>-0.077</td>
<td>-0.062</td>
<td>-0.080</td>
<td>-0.076</td>
</tr>
<tr>
<td>Policy Rate Differential</td>
<td>-0.156</td>
<td>-0.141</td>
<td>-0.171</td>
<td>0.070</td>
<td>-0.168</td>
<td>0.056</td>
<td>0.041</td>
</tr>
<tr>
<td>LSAP</td>
<td>0.007</td>
<td>0.002</td>
<td>0.002</td>
<td>-0.011</td>
<td>0.005</td>
<td>-0.011</td>
<td>-0.007</td>
</tr>
<tr>
<td>VIX</td>
<td>-0.005</td>
<td>-0.011</td>
<td>-0.002</td>
<td>-0.031*</td>
<td>-0.013</td>
<td>-0.031*</td>
<td>-0.031*</td>
</tr>
<tr>
<td>N</td>
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<td>289</td>
<td>289</td>
<td>289</td>
<td>289</td>
<td>273</td>
<td>273</td>
</tr>
<tr>
<td>adj. R-sq</td>
<td>0.970</td>
<td>0.970</td>
<td>0.969</td>
<td>0.960</td>
<td>0.970</td>
<td>0.960</td>
<td>0.960</td>
</tr>
</tbody>
</table>
Table 4. Equity Flows to EMEs
Reported are results from OLS regressions of various flow measures. The measures in Panels A and B are flow-based and include an income effect with a more active switching component. The stock-based measures in Panel C do not include portfolio growth but still have passive and active components. The stock-based measure in Panel D isolates active portfolio reallocations. The working sample of 19 countries includes India, Indonesia, Korea, Malaysia, Philippines, Taiwan, and Thailand; Argentina, Brazil, Chile, Colombia, and Mexico; Czech Republic, Hungary, Poland, and Romania; and Israel, Turkey, and South Africa. Regressions estimated from 2002:Q1 to 2012 Q4 and include country fixed effects. See the Data Appendix for variable definitions. Robust standard errors, computed using clustering at the country level, are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

<table>
<thead>
<tr>
<th></th>
<th>A. ROW Flow-based Measures that Combine Income and Switching Effects</th>
<th>B. US Flow-based Measures that Combine Income and Switching Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BOP Equity Inflows / GDP</td>
<td>BOP Equity Inflows / Market cap</td>
</tr>
<tr>
<td>GDP diff</td>
<td>-0.034</td>
<td>-0.123**</td>
</tr>
<tr>
<td></td>
<td>(0.037)</td>
<td>(0.056)</td>
</tr>
<tr>
<td>VIX</td>
<td>-0.062***</td>
<td>-0.089***</td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
<td>(0.021)</td>
</tr>
<tr>
<td>10-year Treasury: non-LSAPs</td>
<td>0.048</td>
<td>-0.457</td>
</tr>
<tr>
<td></td>
<td>(0.111)</td>
<td>(0.305)</td>
</tr>
<tr>
<td>Lag equity returns diff</td>
<td>0.459***</td>
<td>0.499***</td>
</tr>
<tr>
<td></td>
<td>(0.107)</td>
<td>(0.174)</td>
</tr>
<tr>
<td>REER dev</td>
<td>0.001</td>
<td>0.017*</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.009)</td>
</tr>
<tr>
<td>Policy diff</td>
<td>-0.008</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>(0.014)</td>
<td>(0.020)</td>
</tr>
<tr>
<td>Total CFM</td>
<td>-0.041*</td>
<td>-0.077*</td>
</tr>
<tr>
<td></td>
<td>(0.024)</td>
<td>(0.044)</td>
</tr>
<tr>
<td>10-year Treasury: LSAPs</td>
<td>-0.708***</td>
<td>-0.217</td>
</tr>
<tr>
<td></td>
<td>(0.266)</td>
<td>(0.385)</td>
</tr>
<tr>
<td>N</td>
<td>758</td>
<td>434</td>
</tr>
<tr>
<td>R-sq</td>
<td>0.120</td>
<td>0.219</td>
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### Table 4 (cont.). Equity Flows to EMEs

#### C. Stock-based Measures that Combine Passive and Active Reallocations

<table>
<thead>
<tr>
<th></th>
<th>US Portfolio Share (Foreign)</th>
<th>US Portfolio Share (Global)</th>
<th>US RelWgt (Global)</th>
<th>D. Isolating Active Reallocations</th>
<th>Normalized US RelWgt (Global)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full</td>
<td>Pre</td>
<td>Post</td>
<td>Full</td>
<td>Pre</td>
</tr>
<tr>
<td>GDP diff</td>
<td>-0.0007</td>
<td>-0.0007</td>
<td>-0.0016</td>
<td>-0.0005</td>
<td>-0.0005</td>
</tr>
<tr>
<td></td>
<td>(0.0014)</td>
<td>(0.0023)</td>
<td>(0.0019)</td>
<td>(0.0004)</td>
<td>(0.0005)</td>
</tr>
<tr>
<td>VIX</td>
<td>-0.0004</td>
<td>-0.0006</td>
<td>-0.0007</td>
<td>-0.002*</td>
<td>-0.0002</td>
</tr>
<tr>
<td></td>
<td>(0.0005)</td>
<td>(0.0008)</td>
<td>(0.0012)</td>
<td>(0.0011)</td>
<td>(0.0002)</td>
</tr>
<tr>
<td>10-year Treasury: non-LSAPs</td>
<td>-0.0056</td>
<td>-0.0259**</td>
<td>-0.0128**</td>
<td>-0.0003</td>
<td>-0.0036</td>
</tr>
<tr>
<td></td>
<td>(0.0047)</td>
<td>(0.0115)</td>
<td>(0.0074)</td>
<td>(0.0014)</td>
<td>(0.0025)</td>
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<tr>
<td>Lag equity returns diff</td>
<td>0.0826***</td>
<td>0.0993***</td>
<td>0.0541***</td>
<td>0.0206***</td>
<td>0.0200***</td>
</tr>
<tr>
<td></td>
<td>(0.0060)</td>
<td>(0.0081)</td>
<td>(0.0078)</td>
<td>(0.0016)</td>
<td>(0.0018)</td>
</tr>
<tr>
<td>REER dev</td>
<td>0.0003</td>
<td>0.0009</td>
<td>0.0033</td>
<td>0.0001</td>
<td>0.0004**</td>
</tr>
<tr>
<td></td>
<td>(0.0006)</td>
<td>(0.0006)</td>
<td>(0.0028)</td>
<td>(0.0002)</td>
<td>(0.0001)</td>
</tr>
<tr>
<td>Policy diff</td>
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<td>-0.0008</td>
<td>-0.0111</td>
<td>-0.003</td>
<td>-0.0004</td>
</tr>
<tr>
<td></td>
<td>(0.0010)</td>
<td>(0.0009)</td>
<td>(0.0080)</td>
<td>(0.0003)</td>
<td>(0.0002)</td>
</tr>
<tr>
<td>Total CFM</td>
<td>-0.0012</td>
<td>0.0002</td>
<td>-0.0203**</td>
<td>-0.0006</td>
<td>-0.0002</td>
</tr>
<tr>
<td></td>
<td>(0.0013)</td>
<td>(0.0017)</td>
<td>(0.0076)</td>
<td>(0.0004)</td>
<td>(0.0004)</td>
</tr>
<tr>
<td>10-year Treasury: LSAPs</td>
<td>-0.0295**</td>
<td>-0.0244</td>
<td>-0.0124***</td>
<td>-0.0122**</td>
<td>-0.7111***</td>
</tr>
<tr>
<td></td>
<td>(0.0118)</td>
<td>(0.0192)</td>
<td>(0.0033)</td>
<td>(0.0056)</td>
<td>(0.2652)</td>
</tr>
</tbody>
</table>

| N                      | 801                           | 459                          | 266               | 801                           | 459                          | 266                           | 801                           | 459                          | 266                           | 801                           | 459                          | 266                           |
| R-sq                   | 0.168                         | 0.273                        | 0.209             | 0.174                         | 0.333                        | 0.238                         | 0.072                         | 0.088                        | 0.140                         | 0.043                         | 0.066                        | 0.077                        |